

CLAIMS

1. A robust tomato variety homozygous for the *dg* mutation, wherein tomatoes grown from this variety have an average lycopene content at least two fold its average content in currently available varieties, while being
5 devoid of deleterious traits associated with the *dg* mutation, when measured at peak lycopene content.
2. The variety of claim 1, wherein the variety is a stable parent line.
3. The variety of claim 1, wherein the variety is a hybrid.
4. The variety of claim 1 wherein the average lycopene content in the fruit
10 crop is at least 200 ppm plus or minus the standard error from the mean.
5. The variety of any one of claims 1-3 which is devoid of *dg*-linked deleterious traits selected from the group consisting of poor germination rate, shallow root system, brittle stems, thin and/or fragile leaves, premature defoliation, low yield, and small fruit.
6. The variety of claim 3 selected from the group consisting of hybrids
15 designated HA3512, HA3513, HA3518 and HA3519.
7. The variety of claim 6 designated HA3518, a sample of the seed of this variety having been deposited with the American Type Culture Collection.
8. A seed of a robust tomato variety homozygous for the *dg* mutation, wherein
20 tomatoes grown from this variety have an average lycopene content at least two fold its average content in currently available varieties, while being devoid of deleterious traits associated with the *dg* mutation, when measured at peak lycopene content.
9. The seed of claim 8 wherein the variety is a stable parent line.
10. The seed of claim 8 wherein the variety is a hybrid.
11. The seed of claim 8 wherein the average lycopene content in the fruit crop
25 is at least 200 ppm plus or minus the standard error of the mean.
12. The seed of any one of claims 8-11 which is devoid of *dg*-linked deleterious traits selected from the group consisting of poor germination rate, shallow root system, brittle stems, thin and/or fragile leaves, premature
30 defoliation, low yield and small fruit.
13. The seed of claim 10 selected from the group consisting of hybrids designated HA3512, HA3513, HA3518 and HA3519.

14. The seed of claim 13 designated HA3518, a sample of the seed of this variety having been deposited with the American Type Culture Collection.
15. A tomato plant, or part thereof, produced by growing the seed of any one of claims 8-14.
- 5 16. Pollen of the plant of claim 15.
17. An ovule of the plant of claim 15.
18. The plant of claim 15 further comprising an additional trait consisting of herbicide resistance, insect resistance, resistance to bacterial, fungal or viral disease, male sterility and improved nutritional value.
- 10 19. The plant of claim 15 further comprising an additional trait selected from at least one type of disease resistance and at least one type of stress resistance.
20. The plant of claim 15 further comprising an additional trait introduced by genetic transformation.
- 15 21. The plant of claim 18 further comprising an additional trait introduced by genetic transformation.
22. The tomato plant, or part thereof, of claim 15, wherein the plant or parts thereof have been transformed so that its genomic material contains one or more transgenes operably linked to one or more regulatory elements.
- 20 23. The tomato plant, or part thereof, of claim 18, wherein the plant or parts thereof have been transformed so that its genomic material contains one or more transgenes operably linked to one or more regulatory elements.
24. A tissue culture of regenerable cells of a tomato plant of claim 15.
25. A tissue culture according to claim 24, comprising cells or protoplasts from a tissue selected from the group consisting of leaves, pollen, embryos, roots, 25 root tips, anthers, flowers, fruit and seeds.
26. The tissue culture of regenerable cells of claim 24, wherein the tissue regenerates plants capable of expressing all the morphological and physiological characteristics of the hybrid HA3518.
- 30 27. A tomato plant regenerated from the tissue culture of claim 24, capable of expressing all the morphological and physiological characteristics of the hybrid HA3518.
28. A method for producing a hybrid tomato seed comprising crossing a first parent tomato plant with a second parent tomato plant and harvesting the

resultant hybrid F₁ seed, wherein at least one of the first or the second parent tomato plant is a variety according to claim 2.

29. A hybrid tomato seed produced by the method of claim 25.

30. A hybrid tomato plant, or parts thereof, produced by growing the hybrid tomato seed of claim 29.

31. Tomato seed produced by growing the hybrid tomato plant of claim 30.

32. A method of producing a tomato plant derived from a hybrid tomato variety according to claim 3, comprising:

- a. crossing a first plant that is a hybrid plant homozygous for the dg mutation according to the present invention with a second tomato plant to yield first progeny seeds;
- b. growing the first progeny seed under suitable plant growth conditions to yield an F₁ tomato plant of the first hybrid plant; optionally
- c. crossing the plant obtained in step (b) with itself or with a third tomato plant to yield second progeny seeds derived from said first hybrid plant;
- d. growing the second progeny seed under suitable plant growth conditions to yield additional tomato plant derived of said first hybrid plant; and further optionally
- e. repeating the steps of crossing and growing from 1 to 5 or more times to generate further tomato plants derived from said first hybrid plant.

33. The method of claim 32 wherein the hybrid variety is selected from the hybrids designated HA3512, HA3513, HA3518 and HA3519.

34. The method of claim 33, wherein the hybrid variety is HA3518.

35. A method for producing a tomato plant that contains in its genetic material at least one transgene, comprising crossing the tomato plant of claim 20 with either a second plant of another tomato variety or a non-transformed tomato plant according to claim 1, so that the genetic material of the progeny that results from the cross contains the at least one transgene operably linked to a regulatory element.

36. A tomato plant, or part thereof, produced by the method of claim 35.

37. A tomato plant according to claim 15 Further comprising a single trait conversion.

38. The tomato plant of claim 37 wherein the single trait confers a characteristic selected from the group consisting of herbicide resistance, insect resistance, resistance to bacterial, fungal or viral disease, male sterility and improved nutritional value.